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ABSTRACT

This teaching plan is designed to assist nursing instructors assigned to advanced medical surgical nursing courses in acquainting students with the basic skills needed to perform electrocardiographic (ECG or EKG) interpretations. The first part of the teaching plan contains a statement of purpose; audience recommendations; a flow chart detailing the organization of the program; program characteristics, objectives, and goals; suggested teaching methods; and a list of equipment and materials needed. Addressed in the individual units of the course are the following topics: EKG indicators, EKG ruled paper divisions, the normal cardiac cycle and pathophysiology, abnormal cardiac waves, atrial and ventricular rhythmycity, EKG heart rate determinations, and analysis of EKG strips. Each unit contains an objective, an instructional assignment, a content outline, notes on teaching media and methods, and the time required to present the unit. (MN)

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DESIGN DOCUMENT

"EKG INTERPRETATION PROGRAM"

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INTRODUCTION TO DESIGN DOCUMENT

Nursing instructors, assigned to advanced medical surgical nursing courses with an intensive care (ICU) component, frequently discover that their students lack the necessary skills to accurately assess the cardiac status of their hospitalized clients. This deficiency in skills is sometimes due to the advanced technology in the ICU setting and/or the inability of the nursing curriculum to fully prepare the nursing students for the initial shock of being a primary care provider in an acute atmosphere.

PURPOSE

This design document (teaching plan) was developed for nursing instructors with the aforementioned problem who are interested in acquainting their students with the basic skills needed to perform electrocardiographic (ECG or EKG) interpretations. It is the belief of the author, that prior

knowledge and skill gained with EKG interpretation can help to lessen the "fear" of the ICU setting that students oftentimes experience.

RECOMMENDATIONS FOR AUDIENCE

The EKG interpretation program was specifically designed for advanced medical-surgical nursing students who have demonstrated mastery in the following clinical areas: interpretation of diagnostic lab data and vital signs; physical assessment examination skills and interpretation of acute cardiac symptomatology, i.e., chest pain, dyspnea and restlessness. (See Figure 1).

PROGRAM ORGANIZATION

It is strongly recommended that the program be offered to students who have received theorectical content related to the depleted states of fluid and electrolyte imbalance as well as oxygenation.

COMBINATION ANALYSIS - EKG PROGRAM
(HIERACHIAL & PROCEDURAL)

INSTRUCTIONAL GOAL: ADVANCED MEDICAL SURGICAL NURSING STUDENTS WILL ACCURATELY EVALUATE THEIR HOSPITALIZED CLIENTS EKG STRIPS FOR RATE, RHYTHM, WAVE FORMATION AND DURATION.

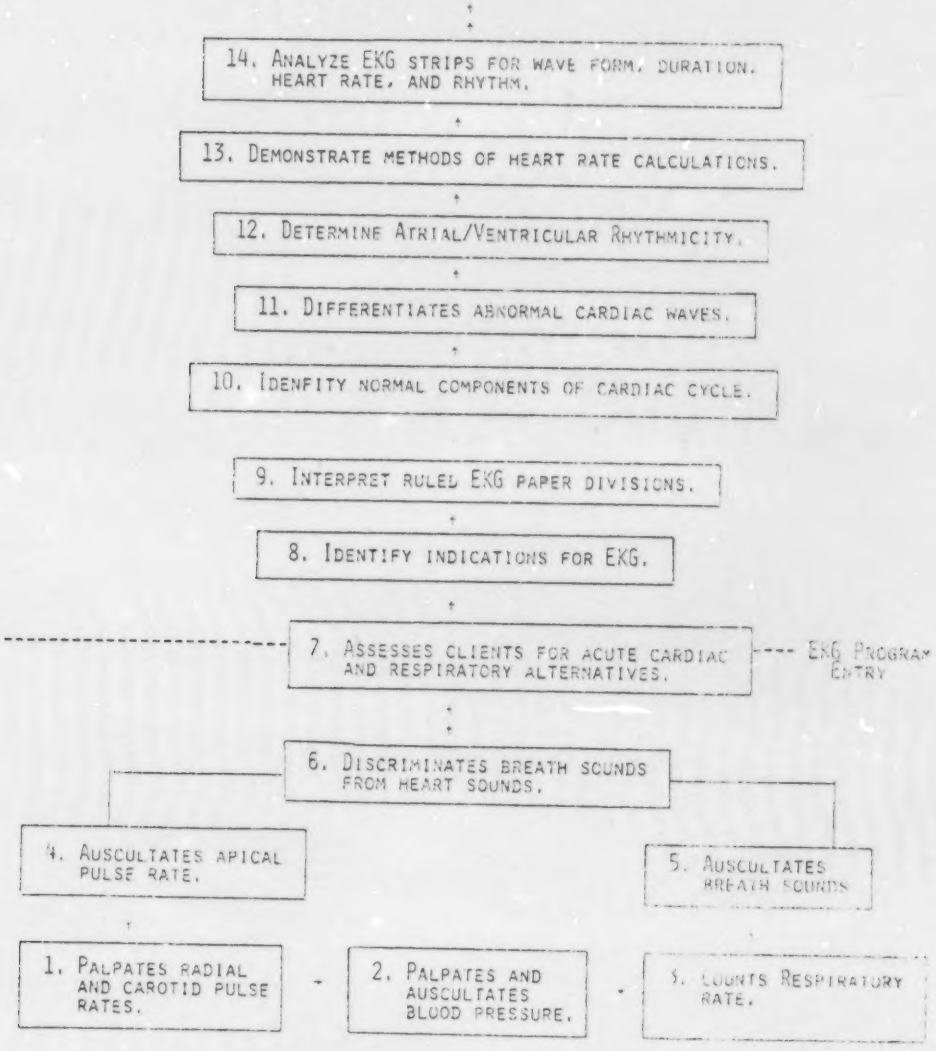
14. ANALYZE EKG STRIPS FOR WAVE FORM, DURATION, HEART RATE, AND RHYTHM.
13. DEMONSTRATE METHODS OF HEART RATE CALCULATIONS.
12. DETERMINE ATRIAL/VENTRICULAR RHYTHMICITY.
11. DIFFERENTIATES ABNORMAL CARDIAC WAVES.
10. IDENFITY NORMAL COMPONENTS OF CARDIAC CYCLE.
9. INTERPRET RULED EKG PAPER DIVISIONS.
8. IDENTIFY INDICATIONS FOR EKG.
7. ASSESSES CLIENTS FOR ACUTE CARDIAC AND RESPIRATORY ALTERNATIVES.
EKG PROGRAM ENTRY
6. DISCRIMINATES BREATH SOUNDS FROM HEART SOUNDS.
4. AUSCULTATES APICAL PULSE RATE.
5. AUSCULTATES BREATH SOUNDS
1. PALPATES RADIAL AND CAROTID PULSE RATES.
2. PALPATES AND AUSCULTATES BLOOD PRESSURE.
3. COUNTS RESPIRATORY RATE.

Figure 1

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PROGRAM CHARACTERISTICS

The entire program should be given within a one three hour period of instructions.

However, it can be offered in smaller intervals of time extended over days to weeks if necessary. It is advised that the presenter(s) attempts to cover two objectives per class meeting if the program is divided into smaller time intervals. Ideally, the program was designed to be offered to a group of 10-12 students in a nursing-laboratory like setting however, a lecture hall can be used if the program must be offered to large numbers of students.

The program can also be further developed to include other components of EKG monitoring such as performing a 12 lead EKG and telemetry. It is also recommended that the program be completed 1-2 days before introducing students to the ICU setting.

PROGRAM OBJECTIVES

There are a total of seven objectives for this program. The objectives proceed in a logical and sequential manner, i.e., from lower levels of learning to higher levels of learning and from

simple skills to complex skills. Students are expected to demonstrate competency in meeting each objective. The level of competency required to successfully complete each objective is variable and is also dependent upon the individual objective. The program objectives can be summarized as follows: To assist nursing students...

- Identifying clients requiring an EKG.
- Interpreting the ruled EKG divisions.
- Interpreting normal and abnormal waves, intervals and segments in a cardiac cycle.
- Relating physiological events associated with each wave, interval and segment.
- Determining cardiac heart rates from an EKG strip.
- Determining cardiac rhythms from an EKG strip.
- Evaluating his/her assigned client's EKG strip for cardiac rate, rhythm, wave formation, interval and segment.

Please note there is a learner objective which correlates with each program objective. Also, the learner objectives and their levels of competency are cited in the design document. Additionally, the numbers assigned to the learner's objective corresponds with the numbers on the combination analysis.

PROGRAM GOAL

The goal of this program is to provide advanced medical-surgical nursing students with the basic EKG interpretation skills needed in performing cardiac assessments of either hospitalized clients.

LEARNER GOAL

The advanced medical surgical nursing student will accurately analyze the EKG recordings of their assigned hospitalized clients.

TEACHING METHODS

Various teaching methods are utilized to facilitate the student's comprehension of instructions. They can be listed as: lecture/discussion, individual and group exercises such as verbal and written quizzes in addition to pre-instructional and post-instructional examinations.

EQUIPMENT AND MATERIALS NEEDED

The following list of equipment and materials will be needed to conduct the program.

Flip Chart

Movie Screen

Overhead Projector

Tables

Transparency Pens

Chairs

Podium

EKG Oscilloscope

Blackboard

Trainex audiotapes on the following topics: EKG Monitoring and EKG Interpretations.

A copy of each required textbook to be placed on reserve in the library. Additionally, the instructor will need a desk copy of each of the required textbooks.

Students will be required to purchase a caliper and/or stack of plain index cards and required textbooks.

Preferably, the Brunner and Suddarth, Fifth Edition "Textbook of Medical-Surgical Nursing." However any basic textbook of medical-surgical nursing can be used.

The Huang, Dasher, Larson, and McCullough's paperback book entitled Coronary Care Nursing, W.B. Saunders, 1983, is strongly recommended to be utilized along with the basic medical surgical nursing textbook.

TABLE OF CONTENT

Objective	Page Number
EKG Indications	8
EKG Ruled Paper Divisions	9
Normal Cardiac Cycle and Pathophysiology	10
Abnormal Cardiac Waves	11
Atrial and Ventricular Rhythmycity	12
EKG Heart Rate Determinations	13
Analysis of EKG Strips	14

OBJECTIVE: "8"

8A The learner will state 4 circumstances which indicate the need for electrocardiographic monitoring based on the following categories: cardiac, metabolic, inflammatory, and pharmaceutical.

8B The learner will explain the rationale for performance of the EKG for each of the 4 circumstances.

INSTRUCTIONAL ASSIGNMENT:

- Read: Brunner and Suddarth, V Ed., Pg. 560
  Huang, Dasher, Larson, McCoullogh, Pg. 28-29
- View: Videotape "EKG Monitoring"
- Complete Section I - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. Indications for an EKG A. Cardiac Conditions B. Metabolic Conditions C. Inflammatory Conditions D. Pharmacological Agents	Oral Discussion - Summarizing Workbook Section I	10 Minutes

OBJECTIVE: "9"

9 The learner will accurately explain all of the ruled divisions of the EKG Paper.

INSTRUCTIONAL ASSIGNMENT:

- Read: Brunner and Suddarth, V Ed., Pg. 564-565.
  Huang, Dasher, Larson, McCoullogh, Pgs. 29-30.
- Complete Section II - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. E.K.G. "Graph Paper" A. Horizontal Axis B. Vertical Axis C. Divisions 1. Large Square 2. Small Square 3. Marginal Markings	Lecture - Presentation using *Flip Chart of an enlarged 6 second interval of EKG paper. Students can also use 6 second interval of EKG paper in Section II of Workbook. QUESTION/DISCUSSION	15 Minutes

*Substitute with Overhead Projector if group is larger than 12 students.

OBJECTIVE: "10"

10A The learner will name each of the waves, intervals and segments in the normal cardiac cycle.
10B The learner will indicate each of the wave intervals and segments on a given EKG strip.
10C The learner will explain all the physiological events associated with each of the waves, segments and intervals in the normal cardiac cycles.

INSTRUCTIONAL ASSIGNMENT:

- Read: Brunner and Suddarth, V Ed., Pgs. 565-567.
  Huang, Dasher, Larson, McCoullogh, Pgs. 28-33.
- View: Videotape "EKG Interpretations"
- Complete - Section III - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. "P" Wave - Atrial Contraction II. "PR" Interval - AV Node III. "QRS" Wave Complex Ventricular Depolarization IV. "T" Wave - Ventricular Depolarization V. "QT" Interval - Ventricles VI. "ST" Segment - Ventricle	Lecture - Discussion on "The Normal Cardiac Cycle and It's Pathophysiology" *Flip Chart and Section III (Workbook) Sample EKG Strip	30 Minutes

OBJECTIVE: "11"

11 The learner will differientiate ALL abnormal cardiac waves from normal cardiac waves.

INSTRUCTIONAL ASSIGNMENT:

- Read: Brunner and Suddarth, V. Ed., Pgs. 569-572
  Huang, Dasher, Larson, McCoullogh, Pgs. 28-33
- Complete: Section IV - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. Inverted "P" Wave II. Widened/Distorted "QRS" III. Inverted "T" Wave IV. "U" Wave V. Abnormal Physiology	Lecture - Discussion "Comparing Abnormal Waves to Normal Cardiac Waves" (Section IV - Students Workbook" Group Exercise Students will divide into group of 3's. Each group will be given three EKG strips to interpret, e.g., wave: name, shape, location, length of duration and deflection.	30 Minutes

OBJECTIVE: "12"

12 The learner will determine the rhythmicity of the cardiac cycle (for atrias and ventricles) using an index card and a caliper when given a 60 second EKG strip with 80-100% accuracy.

INSTRUCTIONAL ASSIGNMENT:

- View Trainex Videocassette on "Interpretation of the EKG Recording"
- Complete Section V - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. Overview of the importance of determining the rhythmicity of the cardiac cycle. A. Atrial Rhythmicity B. Ventricular Rhythmicity 1. Normal Sinus Rhythm (NSR) 2. Arrhythmias	Lecture - Discussion	10 Minutes
II. Determinations of Cardiac Rhythmicity (Atrial and Ventricular) A. Paper and Pencil method 1. P to P interval 2. R to R interval B. Utilization of Calipers 1. P to P interval 2. R to R interval	Use Overhead Projector to demonstrate rhythmicity measurements A. Index card and Pencil B. Caliper	25 Minutes

OBJECTIVE: "13"

13 The learner will select the best method (most efficient and accurate) for calculating the heart rate of a client from his/her EKG strip.

INSTRUCTIONAL ASSIGNMENT:

- Read: Huang, Dasher, Larson, McCoullogh, Pgs. 43-44
- Complete: Section VI - Student Workbook

CONTENT	MEDIA/METHOD	TIME
I. Determining the heart beats per minute using the EKG strip. A. Relating the apical pulse rate to EKG events 1. Rules of Triplicate 2. R Waves 3. P. Waves	Lecture - Discussion	20 Minutes
	Group Exercise Students will divide into groupings of 3's. Students will determine heart rate using the 3 techniques when given a sample EKG strip. Students will determine the best method for heart rate determinations and give supporting rational for their respective decisions.	20 Minutes

OBJECTIVE: "14"

14 The learner will accurately ANALYZE two EKG strips for the following: wave formation and duration, rate and rhythmicity, i.e., atrias and ventricles.

INSTRUCTIONAL ASSIGNMENT:

- Completion Section VII Workbook

CONTENT	MEDIA/METHOD	TIME
I. Review A. EKG Waves B. Normal Time Intervals C. Methods for Calculating Rhythmicity D. Methods for Calculating Rate	Oral Discussion	10 Minutes
	Individual Assignment Each student will analyze 2 EKG strips for each of the above mentioned EKG components.	10 Minutes